AN

ACCOUNT

OF THE

METHOD

OF SECURING

BUILDINGS

(AND SHIPS)

AGAINST

FIRE.

AS PRESENTED

TO HIS MAJESTY.

LONDON: MDCCLXXIV.

BRITISH MUSEUM

AN ACCOUNT OF THE METHOD OF SECURING BUILDINGS (AND SHIPS) AGAINST FIRE.

THE propoſed Method of ſecuring Buildings againſt Fire, is, by the Application of thin Iron Plates under the Floors, and to the Ceilings. The Effect of theſe Fire Plates, depends partly, upon their preventing the immediate Acceſs of the Fire itſelf, to the Timbers of the Houſe, and partly, upon their ſtopping the free Supply and Current of Air, without which, no Fire can get to any great Height, or make any deſtructive Progreſs.

The mechanical Part of the Workmanſhip, in the Application of the Fire Plates to any Houſe, is very ſimple, being no more than nailing them to the underſide of the Joiſts, in each Story, in the Manner of a Ceiling, and upon the upper ſide of the Joiſts, before the Floors are laid. A Quantity of dry Rubbiſh of any kind, ſhould be put over the Ceiling Plates, ſomewhat in the Nature of a Counter-Floor, which will deaden ſound between Floors, and at the ſame Time, ſtill farther ſtop the Progreſs of Fire.

The Efficacy of the Fire-Plates applied in this Manner, to ſecure Houſes againſt Fire, is not now a Matter of Speculation, but of Experience; the Trials which have been made, have not been upon Models only, but upon Buildings erected for the Purpoſe, and, I think I may ſay, that the proper Application of the Fire-Plates, would enſure any Degree of Security that the Caſe may require, whether it may be for a Magazine, a Merchant's Warehouſe, a Banker's Shop, or a private Dwelling-houſe. It will likewiſe make a material Difference in a common Dwelling-houſe, whether the Apartments are to be finiſhed with Stucco, or wainſcotted dado high, or wainſcotted to the top of the Room, together with a wooden Cornice. All theſe Circumſtances being taken into due Conſideration, the Preſervative againſt Fire, is to be applied in Diſcretion according to the Caſe. The Experiments which have been made, will juſtify me to ſay, that if the Floor be armed with the Fire-Plates, any Fire will not penetrate through downwards; and if the Ceiling be properly armed, it will not communicate through, to an upper Floor.

But in the Courſe of theſe Experiments, we are inſenſibly led into the Inconſiſtency of ſuppoſing an Houſe thus armed, to be actually on Fire; whereas, the Operation of the Fire-Plates, is to prevent any ſuch Houſe from being liable to take Fire. What we have to deal with in the beginning, is perhaps no more than a ſmall Spark, which, with the Addition of Air and Fuel, might in Time become an Houſe on Fire, but which, without the Concurrence of either muſt die away. It is an eaſier Taſk to prevent Fire than to extinguiſh it. Let the beginning of Fire in any Houſe be ever ſo ſecret, the Preventive Effect of the Fire-Plates, is conſtantly in Force, as an obſtinate unconquerable Negative to its Progreſs. Every Fire, even the greateſt, muſt ariſe from ſmall beginnings; a Difference of Reception to the firſt Progreſs of the ſmalleſt Spark, may decide the whole. A ſingle Fire-Plate under a Crevice in a Floor, or over a Crack in a Ceiling, might have prevented *The Fire of London*. Prevention, when one has hold of a ſound and applying Principle, is not leſs certain, but on the contrary, far more ſecure than any ſubſequent Remedy, This is a fundamental Point to be kept in View with reſpect to the Fire-Plates.

In the Experiments indeed which I have made, I have always applied Faggots and Combuſtibles, to ſet the Fire going; which is not taking the Power of the Fire-Plates, to its greateſt Advantage, of being preventive againſt the Commencement of Fire. To make an Houſe burn, there muſt be a Body of Heat collected ſecretly, 'till it comes to burſt out all at once. It is known, and reaſonably to be preſumed, that this Body of Heat, cannot any where be collected ſo ſecretly, gradually, and effectually, as under Floors, among the Timbers of an Houſe. This Source of Fire, would be effectually prevented, by the Armour under the Floor. This Operation of the Fire-Plates is not demonſtrable,

monſtrable, being a Negative; but to the Eye of Reaſon it will amount to a Demonſtration, that if the Fire-Plates can reſiſt the Power of Fire, when Faggots and Combuſtibles, have given the Aſcendant to its Fury, they will much more eaſily reſiſt it, in its infant and commencing State. The Armour under the Floor being incombuſtible, will prevent any Fire from dropping through Chinks, or Crevices in the Boards, to the Timbers of the Houſe, and lurking there, 'till it forms a great Body of Heat, and burſts out all at once. In common Houſes, a Floor on Fire, is the Houſe on Fire; but in an Houſe that is armed, as the Floor will not take fire, to make a Body of Heat; How is the Houſe to be ſet on Fire?

It ſeems deſirable, that a Set of methodical Experiments ſhould be publickly made; in the firſt Place, to ſhew the utmoſt Power of theſe Fire-Plates in the ſevereſt Trials; and afterwards, ſatisfactorily to reduce the Application of them to practical Purpoſes. I imagine, that the Addition of about 4 per Cent. upon the Expence of Buildings, would ſecure an Houſe againſt the ſevereſt Trials, but as no Man builds an Houſe, with an Intention to ſet fire to a ſcore of Faggots

gots in any one Room, it is abſurd, to think it neceſſary to require Security, againſt ſuch extravagant Suppoſitions; more eſpecially, as it is probable, by purſuing a proper Line of Experiments, that every rational Degree of Security, might be provided at an eaſier Rate, and that an equal Quantity of Fire-Plates might give Security to a greater Number of Houſes.

We are ſo accuſtomed to the frightful Idea of an Houſe on Fire, that it requires ſome Courage of the Underſtanding to believe, that an Houſe might be ſo provided, as that Fire ſhould not be able to make any Progreſs, beyond a certain limited and ſmall Degree. If we had never ſeen the Effects of Fire in any Houſe, beyond the Degree of a Yard or two Square on the Floor, or Part of a Wainſcot, without ſpreading or communicating beyond a ſingle Apartment; it would have been conſidered as a ſlight Accident, which a Baſon of Water might put an end to, whenever it happened. I am inclined to believe, from the Experiments which I have ſeen, that Houſes might be put into that Degree of Security, without the Expence or Trouble of a compleat Armour; and this upon the Principle of ſtopping the Fire in the beginning;

at which Moment, it is as eaſily and as certainly to be kept down, as it becomes tremendous, if it once gets the Aſcendant.

The Principle in Philoſophy is ſtrictly true, That no Fire can ſubſiſt without Air, but it does not by any means follow, that it is neceſſary totally to exclude the Air, to effect the ſufficient Security of Houſes againſt Fire; Nothing leſs.----It is known by conſtant Experience, that Fire will not burn under a common boarded Floor, to any Effect, 'till the Crevices begin to open, though there are always Crevices enough, to let in ſuch a Quantity of Air, as a languiſhing Fire may juſt ſubſiſt upon. But when the Fire begins to widen the Crevices, acquiring freſh Fuel as well as Air; and when the Plaiſter of the Ceiling below begins to drop, leaving the Laths bare, like the moſt combuſtible faggotting, to ſpread the Fire univerſally; and, when a clear Current of Air and Fire is opened through the Frame-Work of Timbers, Joiſts, Laths, and Flooring-Boards, then it is, that the Houſe is, properly ſpeaking, on Fire. But if we have it in our Power, to limit the poſſible Progreſs of any commencing Fire, ſo that it cannot open Acceſs for Air, beyond a very ſmall Aperture;

nor by any Means make a Communication, or free Current between two Stories; the utmoſt poſſible Magnitude of the Fire, under ſuch Circumſtances, can never exceed, what a limited Current of Air can ſupply. Witneſs every common Fire in a Grate, over which you have a compleat Power, to make it riſe or to damp it, in proportion as it is made to lie hollow, or ſtifled, for want of a ſufficient and liberal Current of Air. If the Plaiſter of a Ceiling would not drop, or if the Joints in a Floor would not widen, no Fire could gain any deſtructive Aſcendant. With reſpect to the Fire-Plates, the Joints and Foldings are ſo numerous, that it would be impoſſible to lay them even ſo cloſe as a common boarded Floor, but there is this eſſential Difference, that though there is a Perſpiration of Air, at every Doubling, and Joint of the Plates, yet thoſe Joints will never yield or widen, by the Application of Fire, to give a free Current, and additional Fuel to the beginning Flame.

Can there be any Conſtruction of Combuſtibles, ſo advantageouſly laid for burning, as in the building of an Houſe? the

the Laths as dry as Tinder undermoſt, the Timbers and Joiſts next, with Shavings and Saw-duſt frequently between; then the Flooring over all, adding Fuel as the Ceiling drops, and as the Edges of the Boards open, to admit the Current of Air. Let the Difference of the Conſtruction of an armed Houſe, be compared with this; Fire-Plates nailed to the under ſide of the Joiſts inſtead of Laths, with an Inch or two of Sand and Chalk between, inſtead of Saw-duſt and Shavings, and over all, the Floor ſecured by Fire-Plates. How is it poſſible under theſe Circumſtances, that any Materials, let them be ever ſo combuſtible, ſhould conquer ſuch Obſtacles, and from the ſlighteſt beginning, riſe, in ſpite of them all, to an infinite Fury? As certainly as Effect and Cauſe can in any Caſe be connected, Fire will languiſh 'till it dies, if oppreſſed from the beginning; and nothing but a free Circulation of Air, can raiſe a ſmall Fire to a large one.

After the repeated Trials that have been already made, of theſe Fire-Plates, I think it might be ſafely ſaid, that an Houſe armed in the moſt compleat Manner, may be made proof, againſt any poſſible Caſualty, or even Malice, from Fire. Having therefore Poſſeſſion of certain Conditions of Security at a ſmall Addition of Expence, any ſubſequent Experiments, may be tried and repeated, to aſcertain that Degree of Proviſion, which will be ſufficient in reaſon, in order to retrench needleſs Expence. This will be according to the Caſe; an Houſe with a certain Quantity of Wainſcot, might be ſecured in one Manner, another in another, and ſo for leſs or more; we have but to find out that Proviſion, which will not be ſufficient in any Caſe, and when that is found out, to go to the next Degree for Safety.

The main Queſtion, whether the Fire-Plates will ſecure Houſes from Fire, may be determined by one Houſe, which if it cannot be ſet fire to, by any ſuch Means, as can poſſibly happen in common Life, the Ground-Work will be ſo far decided upon; but when the Queſtion comes to be ſplit, to determine how much is neceſſary for reaſonable Security, ſuch Experiments ſhould be repeatedly tried; that we may not be led to give up a full Security, upon a fallacious Dependance. Unleſs theſe Points are aſcer-

aſcertained by ſpecial Experiments, it might require an endleſs Term of Years, for that Experience to come of itſelf; eſpecially, as every one would be diſpoſed to the ſafeſt ſide, until there were a ſufficient Warrantry, from actual and repeated Experiments, to ſuit each particular Caſe. Such Trials might be publickly made and atteſted, without Fear or Favour. There being no doubt of the Efficacy of the Fire-Plates, at a moderate Expence, the remaining Queſtion is a Point of Oeconomy; and yet it is not merely the Oeconomy of ſaving a few Shillings, where the utmoſt Expence is ſo trifling, that is the main Object; the real Neceſſity is, to forecaſt how we can make the Plates go the fartheſt; for if the Application of them, ſhould in any Meaſure become general, it would make ſuch a Conſumption, as could not eaſily be provided for.

A Propoſal on this Subject, is in Agitation with Ruſſia, where the Devaſtations by Fire, are infinitely beyond what they are in this Country; and, it would be deſirable to have the Manufacture for Exportation, encouraged in our own Country.

This Invention is applicable to SHIPS as well as to HOUSES; that is to ſay, to thoſe Parts of Ships, where there is the greateſt Danger, of Fire lurking unſeen. I do not ſufficiently underſtand the Conſtruction of Ships, to expreſs this in proper Terms, but I have had this Opinion, from ſeveral Gentlemen of the Navy.

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